Amendments to the Claims

This listing of claims will replace all prior versions, and listings, of claims in the above-captioned application.

1. (Currently amended): A method of formulating a batch comprising at least three ingredients, comprising:

determining a number of fractional filing sequences for producing a desired ~~quantity~~ total volume of the batch, wherein the number of fractional filing sequences is at least two;

wherein a first fractional filing sequence comprises:

determining a first target quantity for each of the ingredients

admitting each of the ingredients to a given size container to fill the container to a first fractional fill percentage;

determining the quantities of each ingredient in the container; and

calculating the ratio of the first target quantity to the determined current quantity for at least one of the ingredients;

wherein each subsequent fractional filing sequence comprises

determining the next target quantity of each ingredient needed for the current fractional fill sequence;

calculating the corrected quantity of the at least one ingredient by multiplying the next target quantity of the ingredient by said ratio;

admitting the corrected quantity of the ingredient to the admixture in the container; and

admitting a quantity of the other ingredients to adjust the proportion of ingredients to the target formulation for the current fractional fill sequence;

wherein the total volume of the batch (totalVol) includes:

$$\text{chem1TotalVol} + \text{chem2TotalVol} + \text{diwAddedVol}$$

where chem1TotalVol is a total volume of a first ingredient in the batch; chem2TotalVol is a total volume of a second ingredient in the batch; and diwAddedVol is a total volume of a third ingredient in the batch.

2. (Original): The method of claim 1, wherein the first target quantity of each ingredient (chemFracVol) is determined from the equation:

$$\text{chemFracVol} = \text{chemTotalVol} \cdot \text{pourUp1Frac}$$

where chemTotalVol is the total amount of the ingredient in the batch

pourUp1Frac is the fractional fill percentage of the first fractional filing sequence.

3. (Original): The method of claim 1, wherein determining the quantity of each ingredient in the container comprises determining the percent by weight of each ingredient.

4. (Original): The method of claim 1, further comprising determining the target volumetric blending ratio of the ingredients to be admitted to the container.

5. (Original): The method of claim 8, wherein each ingredient to be admitted to the container has a known supply concentration.

6. (Original): The method of claim 9, further comprising calculating the target quantity of one ingredient based on the target volumetric blending ratio and the supply concentration of the ingredient.

7. (Original): The method of claim 1, further comprising comparing the current ratio of the target quantity to the determined quantity for at least one of the ingredients to the previously measured ratio, wherein if the current ratio is larger than the previous ratio an alarm signal is asserted.

8. (Original): The method of claim 1, wherein the quantity of each ingredient is determined by absorption spectrometry.

9. (Original): The method of claim 1, wherein one ingredient is NH_4OH.

10. (Original): The method of claim 1, wherein one ingredient is H_2O_2.

11. (Original): The method of claim 1, wherein one ingredient is H_2O.

12. (Currently amended): A computer readable medium having stored thereon computer executable instructions for performing a method of formulating a batch comprising at least three ingredients, the method comprising:

determining a number of fractional filing sequences for producing a desired ~~quantity~~ total volume of the batch, wherein the number of fractional filing sequences is at least two;

wherein a first fractional filing sequence comprises:

determining a first target quantity for each of the ingredients

admitting each of the ingredients to a given size container to fill the container to a first fractional fill percentage;

determining the quantities of each ingredient in the container; and

calculating the ratio of the first target quantity to the determined current quantity for at least one of the ingredients;

wherein each subsequent fractional filing sequence comprises

determining the next target quantity of each ingredient needed for the current fractional fill sequence;

calculating the corrected quantity of the at least one ingredient by multiplying the next target quantity of the ingredient by said ratio;

admitting the corrected quantity of the ingredient to the admixture in the container; and

admitting a quantity of the other ingredients to adjust the proportion of ingredients to the target formulation for the current fractional fill sequence;

wherein the total volume of the batch (totalVol) includes:

chem1TotalVol + chem2TotalVol + diwAddedVol

where chem1TotalVol is a total volume of a first ingredient in the batch; chem2TotalVol is a total volume of a second ingredient in the batch; and diwAddedVol is a total volume of a third ingredient in the batch.

13. (Currently amended): An apparatus for formulating a batch comprising at least three ingredients, comprising:

a tank;

at least two chemical dispensing devices, each chemical dispensing device having an input and an output, each input coupled to a chemical supply and each output coupled to the tank;

an analytical instrument for measuring the quantities of one or more ingredients, the analytical instrument coupled to the tank;

a controller coupled to the chemical dispensing devices and the analytical instrument for performing the method comprising:

determining a number of fractional filing sequences for producing a desired ~~quantity~~ total volume of the batch, wherein the number of fractional filing sequences is at least two;

wherein a first fractional filing sequence comprises:

the controller determining a first target quantity for each of the ingredients

the controller causing the chemical dispensing devices to admit each of the ingredients to a given size container to fill the container to a first fractional fill percentage;

determining the quantities of each ingredient in the container; and

the controller calculating the ratio of the first target quantity to the determined current quantity for at least one of the ingredients;

wherein each subsequent fractional filing sequence comprises

the controller determining the next target quantity of each ingredient needed for the current fractional fill sequence;

the controller for calculating the corrected quantity of the at least one ingredient by multiplying the next target quantity of the ingredient by said ratio;

the controller causing the chemical dispensing devices to admit the corrected quantity of the ingredient to the admixture in the container; and

the controller causing the chemical dispensing devices to admit a quantity of the other ingredients to adjust the proportion of ingredients to the target formulation for the current fractional fill sequence;

wherein the total volume of the batch (totalVol) includes:

chem1TotalVol + chem2TotalVol + diwAddedVol

where chem1TotalVol is a total volume of a first ingredient in the batch; chem2TotalVol is a total volume of a second ingredient in the batch; and diwAddedVol is a total volume of a third ingredient in the batch.

14. (Original): A method of formulating a batch of a desired quantity of ingredients in a container using a chemical control device and a series of fractional fill sequences, comprising:

step A: retrieving stored user defined parameter values for a plurality of fractional fill percentages;

step B: calculating the required quantity of each ingredient to admit into the admixture in the container for the first fractional fill using the defined parameter values retrieved in step A;

step C: admitting the required quantity of each ingredient calculated in step B to the admixture in the container;

step D: retrieving feedback from an analytical instrument for determining the quantities of each ingredient in the admixture;

step E: determining if the current fractional fill sequence is either the first or second fractional fill sequence; transitioning to step F if it is the first or second fractional fill sequence; and transitioning to step L if it is not the first or second fractional fill sequence;

step F: determining if the first fractional fill sequence is complete; transitioning to step G if the first fractional fill sequence is complete; and transitioning to step I if the first fractional fill sequence is not complete;

step G: determining if the first fractional fill delta values are already stored; transitioning to step I if the first fractional fill delta values are already stored; transitioning to step H if the first fractional fill delta values are not already stored;

step H: storing the first fractional fill delta values; and transitioning to step I;

step I: determining if the second fractional fill is complete; transitioning to step L if the second fractional fill is not complete; and transitioning to step J if the second fractional fill is complete;

step J: obtaining the second fractional fill delta values; computing the delta between the first fractional delta values and the second fractional fill delta values; determining if any of the second fractional delta values are greater than or equal to the first fractional delta values; transitioning to step K if any of the second fractional delta values are greater than or equal to the first fractional delta values; and transitioning to step L if any of the second fractional delta values are not greater than or equal to the first fractional delta values;

step K: stopping the fractional filling sequence; and communicating an error message;

step L: comparing the feedback from the analytical instrument to the desired quantity of ingredients; calculating an error correction for the chemical control device if the comparison from the analytical instrument to the desired quantity of ingredients are not equal; calculating the required quantity of each ingredient to admit into the admixture in the container for the next fractional fill using the calculated error correction; determining if the final fractional fill sequence is complete; transitioning to step E if the final fractional fill sequence is not complete.

15. (Original): A computer readable medium having stored thereon computer executable instructions for performing a method of formulating a batch of a desired quantity of ingredients in a container using a chemical control device and a series of fractional fill sequences, comprising:

step A: retrieving stored user defined parameter values for a plurality of fractional fill percentages;

step B: calculating the required quantity of each ingredient to admit into the admixture in the container for the first fractional fill using the defined parameter values retrieved in step A;

step C: admitting the required quantity of each ingredient calculated in step B to the admixture in the container;

step D: retrieving feedback from an analytical instrument for determining the quantities of each ingredient in the admixture;

step E: determining if the current fractional fill sequence is either the first or second fractional fill sequence; transitioning to step F if it is the first or second fractional fill sequence; and transitioning to step L if it is not the first or second fractional fill sequence;

step F: determining if the first fractional fill sequence is complete; transitioning to step G if the first fractional fill sequence is complete; and transitioning to step I if the first fractional fill sequence is not complete;

step G: determining if the first fractional fill delta values are already stored; transitioning to step I if the first fractional fill delta values are already stored; transitioning to step H if the first fractional fill delta values are not already stored;

step H: storing the first fractional fill delta values; and transitioning to step I; step I: determining if the second fractional fill is complete; transitioning to step L if the second fractional fill is not complete; and transitioning to step J if the second fractional fill is complete;

step J: obtaining the second fractional fill delta values; computing the delta between the first fractional delta values and the second fractional fill delta values; determining if any of the second fractional delta values are greater than or equal to the first fractional delta values; transitioning to step K if any of the second fractional delta values are greater than or equal to the first fractional delta values; and transitioning to step L if any of the second fractional delta values are not greater than or equal to the first fractional delta values;

step K: stopping the fractional filling sequence; and communicating an error message;

step L: comparing the feedback from the analytical instrument to the desired quantity of ingredients; calculating an error correction for the chemical control device if the comparison from the analytical instrument to the desired quantity of ingredients are not equal; calculating the required quantity of each ingredient to admit into the admixture in the container for the next fractional fill using the calculated error correction; determining if the final fractional fill sequence is complete; transitioning to step E if the final fractional fill sequence is not complete.

It is believed that no fees are due in connection with the filing of this Preliminary Amendment. However, if any fees are due, the Commissioner is hereby authorized to deduct said fees from Meyertons, Hood, Kivlin, Kowert & Goetzel Deposit Account No. 50-1505/5980-00202/EBM.

Respectfully submitted,

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